



Safety Data Sheet (SDS)

NITRIC ACID

Section 1:	Product and Company Identification
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Product Name:	NITRIC ACID	Index Number:	007-004-00-1
Product Number(s):	S010101, S010101-SSEC03, S010101-SSEC04, S010101-SSEC05, S010101-SSEC06, S010101-SSEC09, S010101-SSEC10, S010101-SSEC41, S010101-SSEC61, S010101-SSEC63, S010101-SSEC65, S010101-SSD13, S010101-SSEE03, S010101-SSEE04, S010101-SSEE05, S010101-SSEE06, S010101-SSEE09, S010101-SSEE10, S010101-SSEG03, S010101-SSEG04, S010101-SSEG09, S010101-SSEG10, S010101-SSEG41, S010101-SSEG61, S010101-SSEG65, S010101-SSNC03, S010101-SSNC04, S010101-SSNC05, S010101-SSNC06, S010101-SSNC09, S010101-SSNC10, S010101-SSNC41, S010101-SSNC61, S010101-SSNC63, S010101-SSNC65, S010101-SSND13, S010101-SSNG03, S010101-SSNG04, S010101-SSNG09, S010101-SSNG10, S010101-SSNG41, S010101-SSNG61, S010101-SSNG65, S010101-SSNQ03, S010101-SSNQ09, S020101, S020101-SSEF01, S020101-SSEF02, S020101-SSEF03, S020101-SSEF04, S020101-SSEF05, S020101-SSEF06, S020101-SSEF07, S020101-SSEF08, S020101-SSNF01, S020101-SSNF02, S020101-SSNF03, S020101-SSNF04, S020101-SSNF05, S020101-SSNF06, S020101-SSNF07, S020101-SSNF08, S020101-SSRF01, S020101-SSRF02, S020101-SSRF03, S020101-SSRF04, S020101-SSRF05, S020101-SSRF06, S020101-SSRF07, S020101-SSRF08, S050107, S050107-SSEF03, S050107-SSEF04, S050107-SSEF05, S050107-SSEF06		
Synonyms:	Aqua fortis; Azotic acid; Hydrogen nitrate; Nitryl hydroxide; Nitral; Engraver's acid		
Chemical names:	DE Salpetersäure; ES Ácido nítrico; FR Acide nitrique; IT Acido nitric; NL Salpeterzuur		
Supplier:	SEASTAR CHEMICALS Inc.		
Address:	10005 McDonald Park Road, Sidney, BC V8L 5Y2 CANADA		
Phone Number:	250-655-5880	Fax Number:	250-655-5888
CANUTEC (CAN):	613-996-6666		

Section 2:	Hazards Identification
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Emergency Overview			
Appearance:	Clear, colourless or yellowish liquid		
Target Organs:	Eyes, skin, respiratory system, teeth.		
GHS			
Classification:	Skin corrosion – Category 1A Oxidizing liquid – Category 3 Corrosive to metals – Category 1	Pictograms:	  GHS05 GHS03
Signal Word:	Danger		

Hazard Statements:

H314: Causes severe skin burns and eye damage.

H272: May intensify fire; oxidizer.

H290: May be corrosive to metals.

Precautionary Statements:

P210: Keep away from heat.

P220: Keep/Store away from clothing and other combustible materials.

P221: Take any precaution to avoid mixing with combustibles.

P234: Keep only in original container.

P260: Do not breathe fumes/gas/mist/vapours/spray.

P264: Wash thoroughly after handling.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P301+P330+P331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310: Immediately call a POISON CENTER or doctor/physician.

P363: Wash contaminated clothing before reuse.

P370+P378: In case of fire: Use most appropriate extinguishing media for the surrounding fire, such as flooding quantities of water spray or fog, for extinction.

P390: Absorb spillage to prevent material damage.

P405: Store locked up.

P406: Store in corrosion resistant container with a resistant inner liner.

P501: Dispose of contents/container according to federal, regional and local government requirements.

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Section 3: Composition/Information on Ingredients

CAS No.	Chemical Name	Percent	EINECS / ELINCS No.
7697-37-2	Nitric acid	60-70%	231-714-2
7732-18-5	Water	Balance	231-791-2

Section 4: First Aid Measures

In case of contact:

Inhalation:	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment, use the "buddy" system). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. Do not allow victim to move about unnecessarily. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure. Immediately transport victim to an emergency care facility.
Skin:	Avoid direct contact with this chemical. Wear chemical protective clothing, if necessary. Immediately remove contaminated clothing, shoes, and leather goods. As quickly as possible, flush contaminated area with lukewarm, gently running water for at least 20-30 minutes, by the clock. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Immediately transport victim to an emergency care facility. Discard contaminated clothing, shoes and leather goods. Keep contaminated clothing under water in a closed container until it can be safely discarded.
Eye:	Avoid direct contact. Wear chemical protective gloves, if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 20-30 minutes, by the clock, holding the eyelid(s) open. Neutral saline may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting. Take care not to rinse contaminated water into the unaffected eye or onto the face. If irritation persists, repeat flushing. Quickly transport victim to an emergency care facility. Do NOT allow victim to rub or keep eyes closed.
Ingestion:	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz.) of water. If milk is available, it may be administered after the water has been given. If vomiting occurs naturally, repeat administration of water. Quickly transport victim to an emergency facility.
Notes to Physician/Doctor:	Provide general supportive measures (comfort, warmth, rest). Consult a doctor and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact. All first aid procedures should be periodically reviewed by a doctor familiar with the material and its conditions of use in the workplace.

Section 5: Fire Fighting Measures

Fire Hazard Summary:

Nitric acid does not burn. However, nitric acid is a strong OXIDIZING AGENT and is a serious fire and explosion hazard. Nitric acid can cause combustible materials such as wood, paper, cotton, wool, cloth, oils and grease to ignite spontaneously and will support, accelerate and intensify the burning of combustible materials in a fire. Can react with many metals, particularly in powdered form, to form extremely flammable hydrogen gas. Generates heat when mixed with water. During a fire, nitric acid decomposes with the release of corrosive nitrogen oxide gases. Explosive decomposition may occur under fire conditions and closed containers may rupture violently due to rapid decomposition, if exposed to fire or excessive heat for a sufficient period of time. Firefighter's normal protective equipment (Bunker Gear) will not provide adequate protection. Chemical protective clothing (e.g. chemical splash suit) and positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

Extinguishing Media:	Nitric acid does not burn. Extinguish fire using extinguishing agent suitable for the surrounding fire and not contraindicated for use with nitric acid. Nitric acid is an oxidizer. Therefore, flooding quantities of water spray or fog should be used to fight fires involving nitric acid.
Extinguishing Media to be Avoided:	DO NOT use dry chemical powders containing sodium bicarbonate, potassium bicarbonate, sodium carbonate, calcium carbonate, ammonium phosphate, or ammonium sulfate. Nitric acid may react violently with these extinguishing agents.
Flash Point:	Not combustible (does not burn).
Lower Flammable (Explosive) Limit (LFL/LEL):	Not applicable
Upper Flammable (Explosive) Limit (UFL/UEL):	Not applicable

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Autoignition Temperature:	Not applicable
Sensitivity to Mechanical Impact:	Probably not sensitive. Normally stable.
Sensitivity to Static Charge:	Will not accumulate static charge or be ignited by a static discharge.
Electrical Conductivity:	3.77×10^{12} pS/m (0°C, 100% nitric acid)
Minimum Ignition Energy:	Not applicable
Combustion and Thermal Decomposition Products:	Liquid decomposes to a limited extent when heated, producing corrosive nitrogen oxides.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD IDENTIFICATION – Nitric acid (>40%)

Health:	4 – Very short exposure could cause death or major residual injury.
Flammability:	0 – Will not burn under typical fire conditions.
Reactivity:	0 – Normally stable, even under fire conditions, and not reactive with water.
Special Hazard:	OXIDIZING MATERIAL

Section 6: Accidental Release Measures

Spill Precautions:

Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. Remove or isolate flammable and combustible materials. Ventilate area. Dangerous levels of nitrogen oxides may form during spills of nitric acid. Consider evacuation of down-wind areas. Wear adequate personal protective equipment. Extinguish or remove all ignition sources. Notify government occupational health and safety and environmental authorities.

Clean-up:

Do not touch spilled material. Prevent material from entering sewers, waterways or confined spaces. Keep materials which can burn away from spilled material. Stop or reduce leak if safe to do so. Contain spill with earth, sand, or absorbent material which does not react with spilled material. Do not use sawdust or other organic materials, which will react with nitric acid creating a fire or health hazard. Only trained personnel should attempt to neutralize spills. Neutralizing spill with sodium bicarbonate, sodium carbonate or calcium carbonate will produce large amounts of carbon dioxide gas. Ensure adequate ventilation.

SMALL SPILLS: Soak up spill with absorbent material which does not react with spilled chemical. Put material in suitable, covered, labelled containers. Flush area with large quantities of water. Contaminated absorbent material will pose the same hazards as the spilled product. LARGE SPILLS: Evacuate area. Contact fire and emergency services and supplier for advice.

Section 7: Handling and Storage

Handling:

This material is a STRONG OXIDIZER. This material is also CORROSIVE (to eyes, skin and respiratory tract). Before handling, it is extremely important that engineering controls are operating and that protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly trained regarding its hazards and its safe use. Maintenance and emergency personnel should be advised of potential hazards.

Unprotected persons should avoid all contact with this chemical including contaminated equipment. Immediately report leaks, spills or failures of the engineering controls. If nitric acid is released, immediately put on a suitable respirator and leave the area until the severity of the release is determined. In case of leaks or spills, escape-type respiratory protective equipment should be available in the work area.

Be aware of typical signs and symptoms of poisoning and first aid procedures. Any signs of illness should be reported immediately to supervisory personnel. Seek medical attention for all exposures even if an exposure did not seem excessive. Symptoms of a severe exposure can be delayed.

Avoid contact with all incompatible materials. Nitric acid is a strong acid, a strong oxidizer and is very reactive. It is not combustible but it readily enhances the combustion of other substances. Nitric acid may react violently or explosively with many organic and inorganic chemicals. Flammable hydrogen gas is released on contact with many common metals, particularly metal in powdered form. Significant heat is generated upon contact with water. See Section 10 for more information.

Avoid generating vapours or mists. Prevent the release of vapours or mists into the workplace. If possible, use closed handling systems for processes involving this material. If a closed handling system is not possible, use the smallest possible amounts in a well-ventilated area, separate from the storage area. Ensure that handling systems are corrosion-resistant.

Inspect containers for damage or leaks before handling. Label containers. Use the type of containers recommended by the manufacturer. Handle containers carefully to avoid damage. Keep containers tightly closed when not in use to avoid spillage, vapour release or contamination of the contents. Never return unused or contaminated material to its original container.

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Cautiously, dispense into sturdy containers made of compatible materials. Use corrosion-resistant transfer equipment when dispensing. Secondary protective containers must be used when this material is being carried. When diluting, always add acid to cold water slowly and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing.

Always assume that empty containers contain hazardous residues. Never reuse empty containers, even if they appear to be clean. Do not perform any welding, cutting, soldering, drilling or other hot work on an empty vessel, container or piping until all material has been cleared. Have suitable emergency equipment for fires, spills and leaks readily available. Practice good housekeeping. Maintain handling equipment. Comply with applicable regulations.

Storage:

Store in a cool, dry, well-ventilated area, out of direct sunlight and away from heat. Keep quantities stored as small as possible. Store away from incompatible materials such as flammable materials, oxidizing materials, reducing materials, and strong bases. See Section 10 for more information.

Use corrosion-resistant structural materials, lighting and ventilation systems in the storage area. Wood and other organic/combustible materials should not be used on floors, structural materials and ventilation systems in the storage area. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel.

Keep storage area separate from work areas. Post warning signs. Inspect all incoming containers to make sure they are properly labelled and not damaged. Always store in original labelled container, or in the type of container recommended by the manufacturer/supplier. Suitable storage may include glass bottles and carboys. Protect the label and keep it visible. Keep containers tightly closed when not in use and when empty. Protect from damage. Store containers at a convenient height for handling, below eye level if possible. Inspect storage area regularly for deficiencies, including damaged or leaking containers, signs of corrosion or poor housekeeping.

Keep absorbents for leaks and spills readily available. Contain spills or leaks by storing in trays made from compatible materials. Provide raised sills or ramps at doorways or create a trench which drains to a safe location. Keep empty containers in separate storage area. Assume that empty containers contain hazardous residues. Keep tightly closed. Avoid bulk storage indoors. Storage tanks should be above ground and surrounded with a dike capable of holding entire contents.

Store oxidizing materials according to the occupational health and safety regulations and fire and building codes which will describe the kind of storage area and the type of storage containers for a specified amount of the material. Have appropriate fire extinguishers available in and near the storage area.

Section 8: Exposure Controls/Personal Protection

General Exposure Precautions:

NOTE: Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. This general information can be used to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations.

Engineering Controls:

Engineering methods to control hazardous conditions are preferred. Methods include mechanical ventilation (dilution and local exhaust), process or personnel enclosure, control of process conditions, and process modification (e.g., substitution of a less hazardous material). Administrative controls and personal protective equipment may also be required.

Because of the high potential hazard associated with this substance, stringent control measures such as enclosure or isolation may be necessary. Use a corrosion-resistant local exhaust ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust system. Treatment of exhaust emissions to prevent environmental contamination may be required.

NOTE: Do not use organic or combustible materials such as wood in the construction of ventilation or control systems.

Personal Protective Equipment:

If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection. Have appropriate equipment available for use in emergencies such as spills or fire.

If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Refer to the CSA Standard Z94.4-93, "Selection, Use and Care of Respirators," available from the Canadian Standards Association, Rexdale, Ontario, M9W 1R3.

Eye / Face protection:	Wear chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. A face shield may also be necessary.
Skin protection:	Wear impervious gloves and appropriate protective clothing. Choose body protection according to the

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	amount and concentration of the substance at the work place. Have a safety shower/eye-wash readily available in the immediate work area.
Resistance of Materials for Protective Clothing:	Guidelines for Nitric acid, 30-70 percent: RECOMMENDED (resistance to breakthrough longer than 8 hours): Butyl rubber; Neoprene rubber; Viton®; Viton®/Butyl rubber; Barrier (PE/PA/PE); Trelchem® HPS and VPS; Tychem® SL (Saranex®), CPF 3, F, BR/LV, Responder®, and TK. RECOMMENDED (resistance to breakthrough longer than 4 hours): Polyethylene; Silver Shield/4H® (polyethylene/ethylene vinyl alcohol). CAUTION, use for short periods only (resistance to breakthrough within 1 to 4 hours): Polyvinylchloride. NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): Natural rubber; Nitrile rubber; Polyvinyl alcohol.
Inhalation / Ventilation:	Use in a chemical fume hood. Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Personal Hygiene:	Remove contaminated clothing immediately. Keep contaminated clothing thoroughly wet or immersed in water in closed containers. Discard or launder before rewearing. Inform laundry personnel of contaminant's hazards. Do not eat or drink in work areas. Wash hands thoroughly after handling this material. Maintain good housekeeping.

EXPOSURE GUIDELINES – Listed under Nitric acid, as HNO₃

NIOSH:	TWA: 2 ppm (5 mg/m ³); STEL: 4 ppm (10 mg/m ³)
ACGIH:	TWA: 2 ppm (5.2 mg/m ³); STEL: 4 ppm (10 mg/m ³)
OSHA Final PEL:	TWA: 2 ppm (5 mg/m ³)

Section 9: Physical and Chemical Properties

Form:	Liquid	Melting/Freezing Point:	70% w/w: -41 °C (-42 °F) 50% w/w: -20 °C (-4 °F)
Color:	Clear to yellow	Boiling Point:	70% w/w: 119.3 °C (246.74 °F) 68% w/w: 120.5 °C (248.9 °F) 60% w/w: 118.2 °C (244.76 °F) 50% w/w: 114.7 – 116.4 °C (238.5 – 241.5 °F)
Odour:	Strong – acrid odour		
Odour Threshold:	0.29 - 0.98 ppm (detection)	pH:	1.0 (0.1 M solution)
Chemical Formula:	HNO ₃	Density: (@ 20 °C, water=1)	70% w/w: 1.4134 g/mL 68% w/w: 1.41 g/mL 60% w/w: 1.3667 g/mL 50% w/w: 1.31 g/mL
Formula Weight:	63.0119 g/mol		
Solubility:	Very soluble in water	Vapour Pressure: (Partial pressure, @ 20 °C)	60% w/w: 0.12 kPa (0.90 mmHg) 70% w/w: 0.37 kPa (2.78 mmHg)
Vapour Density:	2.17 (air=1) (calc.)		

Section 10: Stability and Reactivity

Normally stable. Nitric acid has a tendency to slowly decompose at room temperature to form nitrogen oxides, which may colour the acid yellow or red. The decomposition is accelerated by exposure to light and increases in temperature.

Oxidizing Properties:

The NFPA lists nitric acid (40% or less) as a Class 1 oxidizer and nitric acid (more than 40% but less than 80%) as a Class 2 oxidizer. A Class 1 oxidizer meets the definition of an oxidizer (any material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials) and does not moderately increase the burning rate of combustible materials with which it comes into contact. A Class 2 oxidizer will cause a moderate increase in the burning rate of combustible materials with which it comes into contact.

Incompatibility – Materials to be Avoided:

NOTE: Chemical reactions that could result in a hazardous situation (e.g. generation of flammable or toxic chemicals, fire or detonation) are listed here. Many of these reactions can be done safely if specific control measures (e.g. cooling of the reaction) are in place. Although not intended to be

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complete, an overview of important reactions involving common chemicals is provided to assist in the development of safe work practices.

Nitric acid is a strong acid and a strong oxidizing agent and is very reactive. Nitric acid is frequently involved in reactive incidents.

MOST METALS particularly POWDERED METALS (e.g. antimony, bismuth, germanium, manganese or titanium), ALKALI METALS (e.g. lithium or sodium) or ALKALINE EARTH METALS (e.g. magnesium or calcium) - may react violently or explosively, and/or cause fire, with generation of extremely flammable hydrogen gas.

ORGANIC CHEMICALS (e.g., alcohols, acids, anhydrides, aldehydes, ketones, amines, ethers, hydrocarbons, alkanethiols, nitriles, nitroalkanes and nitroaromatics) – may react violently or explosively, and/or ignite spontaneously.

NON-METALS (e.g. arsenic, boron, finely divided carbon, phosphorus or silicon), NON-METAL HYDRIDES (e.g. arsine, phosphine, stibine or tetraborane) or REDUCING AGENTS (e.g. potassium phosphinate) - may react violently or explosively and ignite.

CROTONALDEHYDE, HYDRAZINE, DIMETHYLHYDRAZINE, DIVINYL ETHER, PYROCATECHOL - ignite spontaneously (hypergolic) on contact with concentrated nitric acid, the ignition delay being 1 millisecond (ms).

AMMONIA, ANILINE, DIBORANE, FURFURYL ALCOHOL or TERPENES - mixtures are self-igniting.

SULFIDES (e.g. sodium or potassium sulfide) - toxic and flammable hydrogen sulfide gas and toxic sulfur dioxide gas may be generated.

CARBIDES (e.g. cesium carbide), FLUORINE, PHOSPHORUS HALIDES (e.g. phosphorus trichloride) or OTHER PHOSPHORUS COMPOUNDS (e.g. cadmium phosphide) – may ignite and/or explode.

METAL CYANIDES (e.g. sodium cyanide, potassium cyanide or calcium cyanide) - mixture produces a violent reaction, with formation of very toxic and flammable hydrogen cyanide.

SULFUR HALIDES (e.g. sulfur dichloride or disulfur dibromide) - interaction is violent, with generation of the corresponding hydrogen halide.

Conditions to avoid:	Air, light, high temperatures.
Hazardous Decomposition Products:	Nitrogen oxides.
Hazardous Polymerization:	None reported.

Corrosivity to Metals:

Nitric acid (5-70%) is corrosive (corrosion rate greater than 1.25 mm/year) to most metals at 21 °C (70 °F), including carbon steel (e.g. types 1010, 1020, 1075 and 1095), type 3003 aluminum, cast iron (e.g. gray, ductile and high nickel cast iron), nickel, nickel-base alloys (e.g. Monel and Hastelloy B and D), copper, copper-nickel, bronze (unspecified), aluminum bronze, silicon bronze, brass (unspecified), admiralty brass, naval brass and lead. It attacks (corrosion rate less than or equal to 0.5 mm/year to greater than or equal to 1.27 mm/year) some 400 series stainless steels at 21 °C. Stainless steels with high chromium content (most 300 series) exhibit excellent or good resistance to nitric acid concentrations ranging from 0-65% up to the boiling point. Types 304, 304L, R12S, 2RE10 (high chromium and nickel content) and 7-Mo duplex stainless steel are particularly recommended for use with nitric acid. High-silicon cast iron (Duriron) and high-chromium cast iron, higher chromium nickel alloys (e.g. G-30 and 690), nickel-base alloys (e.g. Hastelloy C and Incoloy 825), tantalum, titanium, zirconium, gold and platinum-type metals also have excellent resistance to nitric acid. Aluminum alloys (types 1100 and 3003) can only be used for very high concentrations of nitric acid (80-100%).

Corrosivity to Non-Metals:

Nitric acid (5-100%) at 21 °C attacks plastics, such as acrylonitrile-butadienestyrene (ABS), nylon, styrene-acrylonitrile, polystyrene and polyurethane; and elastomers, such as nitrile Buna N (NBR), natural rubber, isoprene, neoprene, chloroprene, polyester, styrene butadiene (SBR), polyurethane, chlorinated polyethylene, ethylene-propylene, ethylene-propylene terpolymer and low density polyethylene. Nitric acid (5-100%) does not attack plastics, such as Teflon, and other fluorocarbons; and elastomers such as Viton and other fluorocarbons (e.g. Kalrez and Chemraz (up to 50%)). Nitric acid (concentrations up to 50%) does not attack plastics, e.g. polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC), polypropylene, thermoset polyester (Bisphenol A-fumarate and Isophthalic acid), high density polyethylene and ultra high molecular weight polyethylene and elastomers e.g. butyl rubber.

Section 11: Toxicological Information

Potential Health Effects

Inhalation:	May be fatal if inhaled. Nitric acid readily forms a high vapour concentration at room temperature. It is very corrosive and can release other corrosive and toxic gases upon contact with air, organic materials or metals, thus posing a very serious inhalation hazard. Symptoms of exposure include dryness and/or burning pain in the nose and throat, cough, chest pain, shortness of breath and difficulty breathing. A severe exposure can result in a potentially fatal accumulation of fluid in the lungs (pulmonary edema). Symptoms of pulmonary edema (chest pain and shortness of breath) can be delayed for up to 24 or 48 hours after exposure. The presence of nitrogen oxide gases contributes significantly to the toxic effects observed following nitric acid exposure. However, the strongly corrosive nitric acid is expected to be a severe respiratory irritant on its own.
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Skin:	Nitric acid is corrosive. Corrosive materials are capable of producing severe burns, blisters, ulcers and permanent scarring, depending on the concentration of the solution and the duration of contact. Concentrated solutions produce burns, lower concentrations cause a change in skin colour from yellow to brown, and dilute solutions cause mild irritation and hardening of the skin.
Eye:	Nitric acid is corrosive. Corrosive materials are capable of producing severe eye burns and permanent injury, including blindness, depending on the concentration of the solutions and duration of contact.
Ingestion:	Nitric acid is corrosive and can cause burns to the lips, tongue, throat and stomach, abdominal pain, nausea, vomiting, diarrhea, kidney damage, and death if ingested. May cause perforation of the digestive tract. Because of immediate pain when taken into the mouth, strong mineral acids are not often swallowed.
Chronic:	Long-term exposure may cause skin and respiratory irritation, with possible development of lung injury (e.g. chronic bronchitis). Exposure to nitric acid vapours, mists or aerosols may cause dental erosion and jaw necrosis. To the best of our knowledge, the chronic toxicity of this substance has not been fully investigated.

Effects of Long-Term (Chronic) Exposure

RTECS#:	QU5775000
Descriptor:	Mutagen; Reproductive Effector; Human
LD50/LC50:	LDLo (lowest published lethal dose) Oral, human – 430 mg/kg YAKUD5 Gekkan Yakuji. LC50 (lethal concentration, 50% kill) Inhalation, rat – 260 mg/m ³ /30M VCVN5* "Vrednie chemichescie veshestva. Neorganicheskie soedinenia elementov V-VII groopp". TCLo (lowest published toxic concentration) Inhalation, rat – 460 ppm/1H – Nutritional and Gross Metabolic: weight loss or decreased weight gain TOXID9 Toxicologist.
Epidemiology:	No information found.
Teratogenicity:	No information found.
Reproductive Effects:	ZHYGAM Zeitschrift fuer die Gesamte Hygiene und Ihre Grenzgebiete: TDLo (lowest published toxic dose) Oral, rat – 21,150 mg/kg (female 1-21D after conception) – Effects on Embryo or Fetus: fetotoxicity. TDLo Oral, rat – 2,345 mg/kg (female 18D after conception) – Effects on Newborn: biochemical and metabolic.
Neurotoxicity:	No information found.
Mutagenicity:	No information found.
Carcinogenicity:	Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Section 12: Ecological Information

Ecotoxicity: *Gambusia affinis* (Mosquito fish): TLm=72 mg/L/96H (fresh water). *Lepomis macrochirus* (Bluegill): LC100=36 mg/L (fresh water). *Ophryotrocha diadema* (aquatic worm): LC50=33-100 mg/L/48H (salt water).

Section 13: Disposal Considerations

Review federal, regional and local government requirements prior to disposal. Authorities may not permit disposal of waste nitric acid until certain neutralization standards have been achieved. Store material for disposal as indicated in Section 7. Disposal by secure landfill may be acceptable.

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Section 14: Transport Information

US DEPARTMENT OF TRANSPORT (DOT) HAZARDOUS MATERIALS SHIPPING INFORMATION (49 CFR)

Shipping Name and Description: NITRIC ACID, other than red fuming, with at least 65 percent, but not more than 70 percent nitric acid

Identification Number: UN2031 Hazard Class or Division: 8 Packing Group: II

Shipping Name and Description: NITRIC ACID, other than red fuming, with more than 20 percent and less than 65 percent nitric acid

Identification Number: UN2031 Hazard Class or Division: 8 Packing Group: II

CANADIAN TRANSPORTATION OF DANGEROUS GOODS (TDG) SHIPPING INFORMATION

Shipping Name and Description: NITRIC ACID other than red fuming, with not more than 70 per cent nitric acid

UN Number: UN2031 Class: 8 Packing Group/Category: II
Special Provisions: --- Marine Pollutant: --- Passenger Carrying Road/Railway Vehicle Index: Forbidden

International Maritime Dangerous Goods (IMDG)

Proper Shipping Name / Description: NITRIC ACID, other than red fuming, with not more than 70 per cent nitric acid

UN Number: 2031 Class or Division (Sub Risk): 8 Packing Group/Category: II
Special Provisions: --- EMS Number: F-A, S-B

International Air Transport Association (IATA)

Proper Shipping Name / Description: Nitric acid other than red fuming, with $\geq 65\%$ but $\leq 70\%$ nitric acid

UN/ID Number: 2031 Class or Division (Sub Risk): 8 (5.1) Packing Group: II
Special Provisions: A1 Passenger / Cargo Aircraft: Forbidden Cargo Aircraft Only: 855 Pkg Inst, 30 L Max Net

Section 15: Regulatory Information

Nitric acid CAS# 7697-37-2

US Federal:

TSCA Listed on the TSCA Inventory.

SARA Title III: Section 302 Subject to the reporting requirement of 1,000 lbs RQ.

SARA Title III: Section 313 Does not exceed the threshold (De Minimis) reporting level of 1,000 lbs.

US State:

Massachusetts Right To Know Subject to this act, 50 lbs RQ.

Pennsylvania Right To Know Subject to this act.

New Jersey Right To Know Subject to this act, RTK# 1356.

California Prop. 65 Not subject to this act.

Canada:

DSL/NDSL Status: Is listed, record number: 8334

WHMIS Classifications:
C – Oxidizing material
E – Corrosive material

Section 16: Other Information

Revision Date: 07-2014, Supersedes 03-214, 02-2013, 12-2010

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